SMR5016/5020

Smart Megapixel Video Recorder

Hardware Manual

Release 1.0
August, 2011

Surveon

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Safety Precautions

Electric Shock Warning

This equipment may cause electric shocks if not handled properly.

- Access to this equipment should only be granted to trained operators and maintenance personnel who have been instructed of, and fully understand the possible hazardous conditions and the consequences of accessing non-field-serviceable units such as the power supplies.
- The system must be unplugged before moving, or in the even that it becomes damaged.

Reliable Grounding

Particular attention should be given to prepare reliable grounding for the power supply connection. It is suggested to use a direct connection to the branch circuit. Check for proper grounding before powering on the device.

Overloading Protection

The device should be installed according to specifications. Provide a suitable power source with electrical overload protection. Do not overload the AC supply branch circuit that provides power to the device.

ESD Precautions

Please observe all conventional anti-ESD methods while handling the device. The use of a grounded wrist strap and an anti-static work pad are recommended. Avoid dust and debris in your work area.

Device Site Recommendations

The device should be installed according to specifications. This device should be operated at a site that is:

- Clean, dry, and free of excessive airborne particles.
- Well-ventilated and away from heat sources such as direct sunlight and radiators.
- Clear of vibration or physical shock.
- Away from strong electromagnetic fields produced by other devices.
- Available with properly grounded wall outlet for power. In regions where power sources are unstable, apply surge suppression.
- Available with sufficient space behind the device for cabling.

Regulatory Compliance Information

Regulatory Compliance Information

- FCC/CE Class A
- IEC 60950

Shown below is the location of the compliance statement label.

FCC (applies in the U.S. and Canada)

FCC Class A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules (47 CFR, Part 2, Part 15 and CISPR PUB. 22 Class A). These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this user's guide, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

Warning!

A shielded power cord is required in order to meet FCC emission limits and also to prevent interference with nearby radio and television reception. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This device is in conformity with the EMC.

Notice for Class A Product

This notice is for class A product only. If the equipment under test is a class B product, this notice should be disregarded.

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instruction for use.

Warning:

This is class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Surveon is committed to being properly prepared and taking all the necessary steps that will result in our compliance with the new European directive, RoHS (2002/95/EC), on or before the specific dates set forth in those applicable laws and regulations. Surveon is applying its own internal efforts and expertise and is working closely with customers and suppliers to achieve compliance while maintaining an uninterrupted supply of quality products. Surveon is currently investigating, evaluating, and qualifying our materials and components to ensure that products sold on or after 1 July 2006, in such territory, are in compliance with the above regulations.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems) This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By proper waste handling of this product you ensure that it has no negative consequences for the environment and human health, which could otherwise be caused if this product is thrown into the garbage bin. The recycling of materials will help to conserve natural resources.

Revision History

Version	Description	Date
1.0	Initial release	August 2011

Chapter 1. Product Overview

1.1. Features and Benefits

The Surveon SMR series is a state-of-the-art network video recorder features hardware RAID, low power and hot swappable hard disks. With 2/5/8-bay hard disk trays, the SMR series is the best in class NVR that supports megapixel quality video of 6 to 32 channels for video retention periods from 7 to 30 days or more. In addition, the SMR series is fully burn-in-tested and uses preloaded Surveon Enterprise VMS to eliminate compatibility issues while reducing maintenance overheads. It is out of question that the SMR series is the most reliable and cost-effective solution for small to medium sized surveillance needs.

1.2. Specifications for the SMR Series

Hardware Specifications

	SMR5016/5020
System Processor	Intel ® ATOM525 Dual Core @ 1.8 GHz
System Memory	DDR3 2GB
Chipset	Intel ® ICH9R
Disk on Module	4GB
Storage	3.5” SATA HDDs x5 ; HDD hot swappable
I/O Interface	• VGA: 1xD-Sub • RJ-45: 2x1 Gigabit Ethernet • USB: 4x USB2.0 • E-SATA: x1
H/W RAID	RAID 0, 1, 5
Electrical	• Input Voltage: 100V~240V, 1.5A • Frequency: 50Hz~60Hz • Power Consumption (in operation): 43W
Operating Environment	In operating • Humidity: 5% to 80% (non-condensing) • Temperature: 5˚C to 40˚C
LCD Panel	Yes
LED Indicator	Yes
Dimensions	190(H) x 110(W) x 245(D) mm
Weight	5 kg (without hard drives)
Certificate	BSMI, CB, FCC / CE Class A , UL60959/ IEC60950, GOST

VMS Specifications

Live View	• Real-time network camera discovery • Versatile views of various screen divisions • HTML and image overlays • Multiple views supported • View patrolling for single or multiple views • Real time vidoe/event alarm display

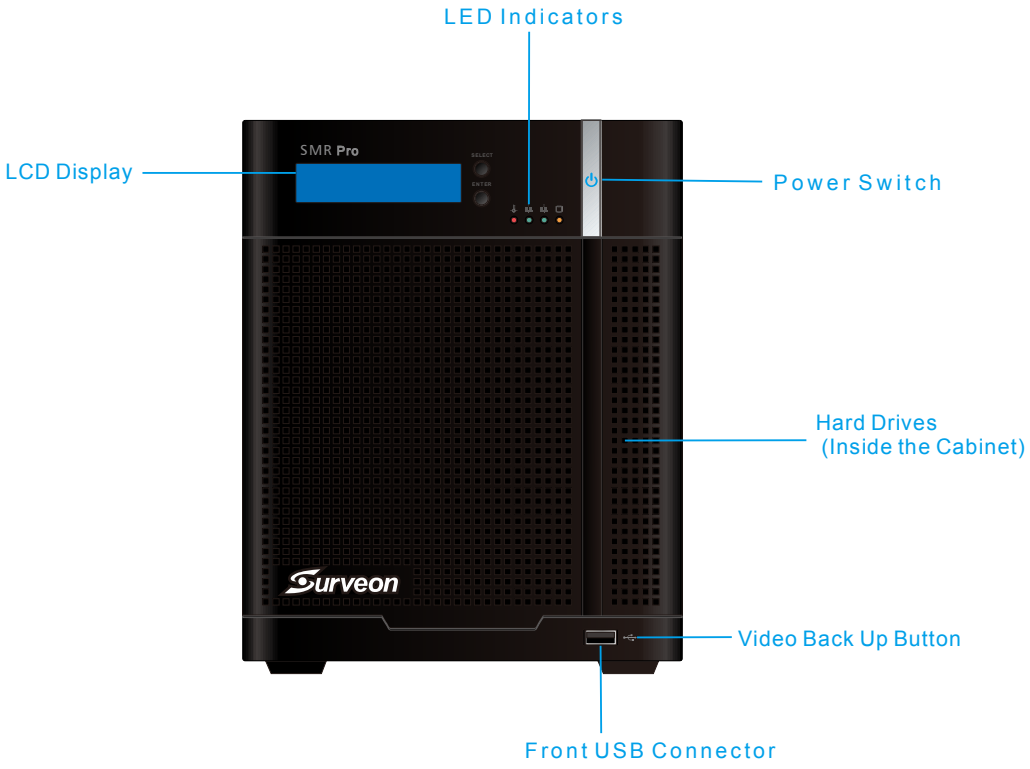
	• Instant playback • Video clip bookmarking
eMAP	• Drag-n-drop camera manipulation • Directional camera display • Hierarchical map structure • Real time event alert • Instant live video of camera • Multiple maps supported
PTZ	• Pan, tilt, zoom operations (dependent of the camera) • Built-in, floating PTZ control panel • Preset position (dependent of the camera) • Scheduled or continous camera patrolling • Event-driven camera patrolling
Investigation	• Search by date, time, camera • Search by pre-defined recent time • Search by VI event combinations • Search over multiple days • Search over multiple cameras • Video clip bookmarking and commenting • Search via built-in VI analyzer • Customizable bookmark • Intuitive, video thumbnail search results • Cue-in, cue-out and repeat • Quick playback by video thumbnail • 1/8, 1/4, 1/2, 1x, 2x, 4x, 8x play, pause, stop • AVI-formated video clip export
Instant Playback	• Supported in video alarm, event alarm, view functions • Pre-defined playback durations • Video clip bookmarking
Video Intelligence	• General motion detection • Missing object detection • Foreign object detection • Intrusion detection • Forbidden area detection • Tampering detection • Virtual fence* • Object counting*
Remote Management	Full functional operation & management via standalone VMS Client
3rd Party IPCAM	AXIS, SONY, Panasonic, Mobotix, Arecont Vision, IQinVision, Zavio, VIVOTEK, ACTi, D-Link, Asoni, AVTech
General & Misc	• Video codec: H.264, MPEG4, MJPEG • Image enhancement • Video privacy mask • Digital zoom in, zoom out • Log viewer • Windows lockup • Client auto login • Digital I/O management • Automatic storage recycling • Client-server architecture • Guaranteed performance of long period recording

	• Configurable video retention period • Digital watermark proofing* • Language supported: English, French, German, Portuguese, Spanish, Simple Chinese, Traditional Chinese

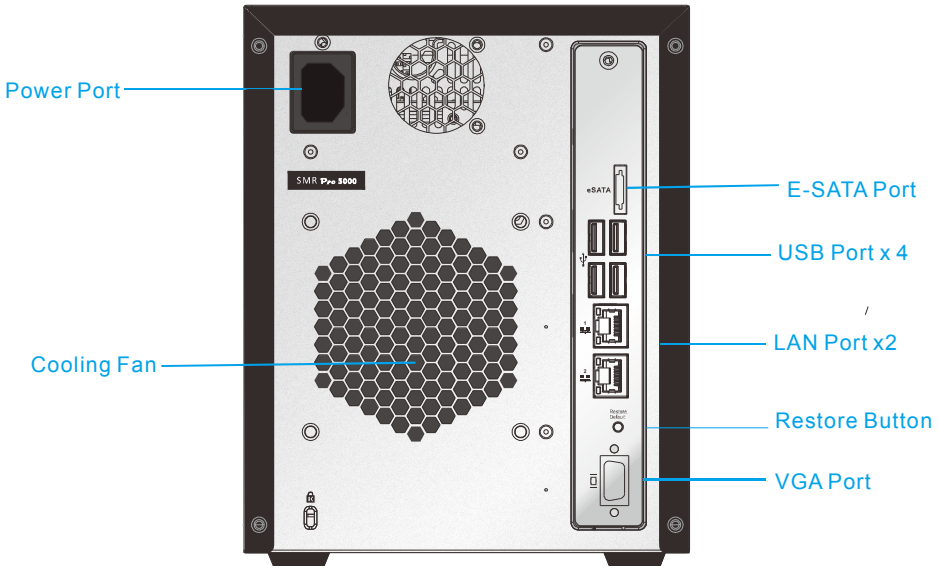
Chapter 2. Hardware Overview

2.1. Overview

Front View

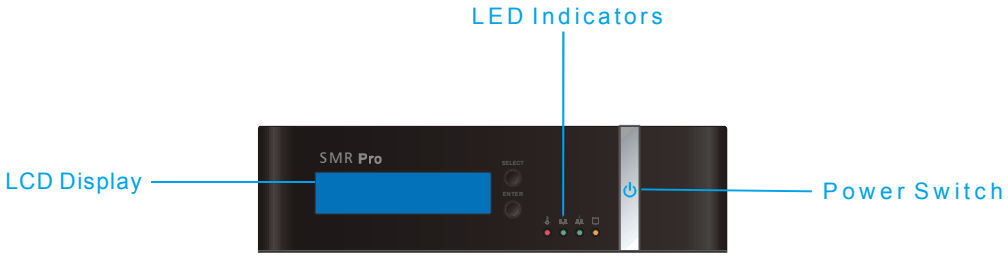


Rear View



2.2. Panel Introduction

Front Panel (Top)

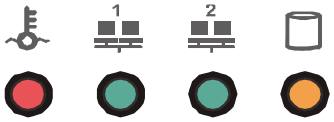


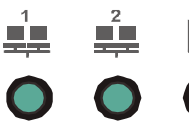
Name	Function
Power Switch	Powers up the SMR. When the power is on, the power indicator will shine in blue.

LCD Module

Name	Function
LCD Display	Shows system messages.
Select Switch	Shows the menu for choosing RAID0, RAID1, or RAID5.
Enter Switch	Confirms the options and functions after the Select Switch is used.

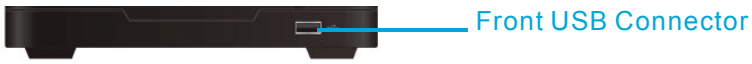
Front Panel LED



Name	Color	LED Status	Function
Network 	Green	On	Indicates that power is on and network is connected.
		Off	Indicates that network is disconnected.
		Blink	Indicates that network activity is in progress.

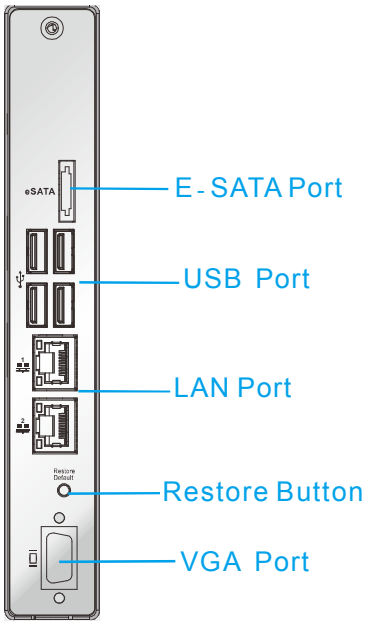
HDD	Amber	On	Indicates that the hard drive can be accessed.
		Off	Indicates that a hard drive read/write error occurred.
		Blink	Indicates one of the followings: (1)Disk volume creation is in progress. (2)Online RAID level migration is in progress. (3)RAID rebuilding is in progress.
System	Red	On	Indicates the system fan is malfunctioning.
		Blink	Indicates that system is starting up.

Front Panel (Bottom)



Name	Function
Front USB Connector	Connects external accessories such as mouse, keyboard or other external devices.

Rear panel components



Name	Function
E-SATA x1	Used for connecting the SMR with E-SATA drives.
USB Port x 4	Used for exporting video clips as evidence support to external storage devices.
LAN Jack (GbE Ethernet port) x2	Used for connecting the SMR with the network.
Restore Button	Reserved
VGA Port	Used for attaching an external monitor to the SMR.

Chapter 3. Installation Guide

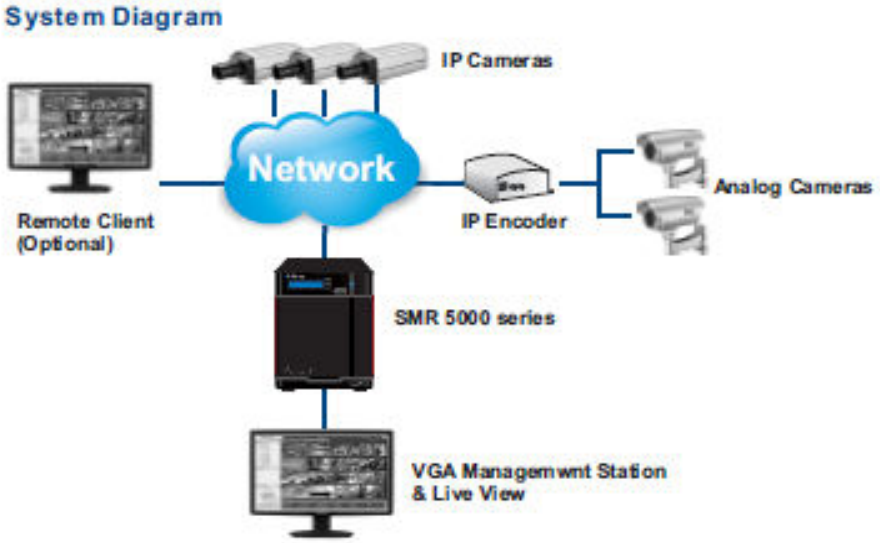
3.1. Before You Start

Checklist for Operating Environment

Users need to prepare the following devices to set up the surveillance system.

Network Video Recorder	SMR5000 series
IP Camera	Network Cameras (such as Surveon CAM5210)
Network	Existing LAN, Switch, Router or Hub (please see the Network Topology below)
Storage	Hard Drives

Note: The hard drives should be purchased separately.



Check Network Topology

Make sure you have the right switch/hub for your environment. Either of the following options will work.

	Common Topology	Reference Product
Existing LAN	LAN Switch with DHCP Server	Office LAN
Router	LAN Switch with build-in DHCP Server	D-Link DIR-130

Switch/Hub	No DHCP Server(refer to the Note below)	D-Link DES-1108

Note: For devices without DHCP Server function, please refer to section 3.7.

3.2. Hard Drive Installation

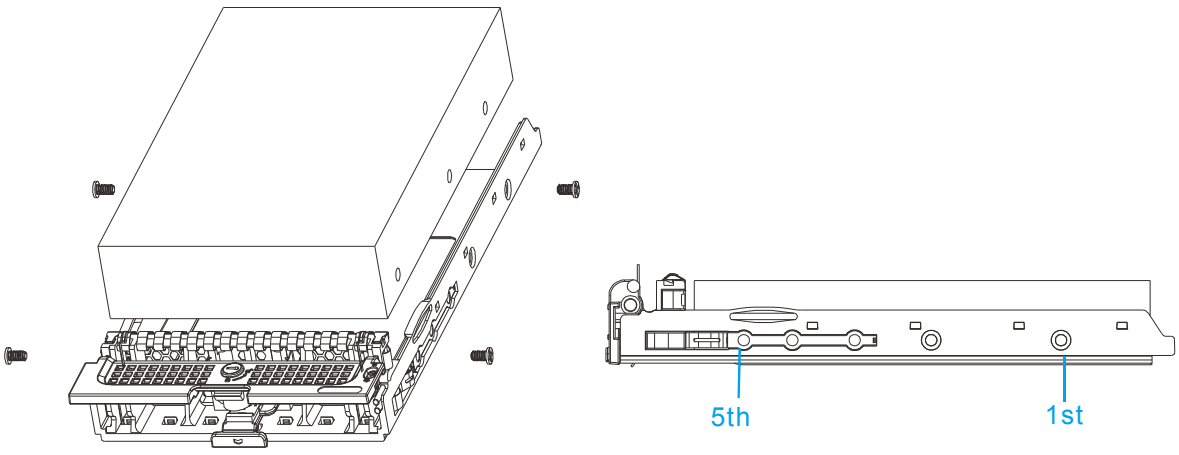
Hard Drive Installation Prerequisites

When purchasing hard drives, the following factors should be considered:

- **Capacity (MB/GB):** Use drives with the same capacity. (The maximum is 2TB.)
- **Drive type:** The system uses SATA interface 3.5-inch hard drives. Please ensure that you purchase the correct hard drives.

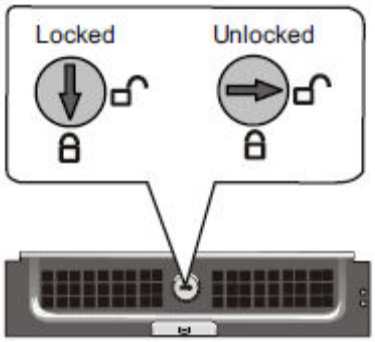
Placing Hard Drive into Drive Tray

Place the hard drive into the drive tray, making sure that the interface connector is facing the open side of the drive tray and its label side facing up.

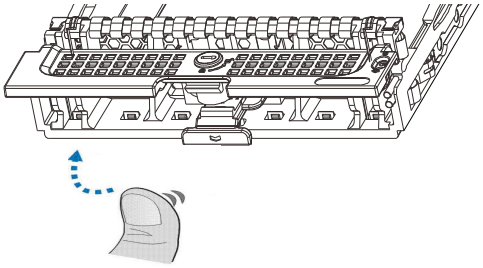


Inserting Hard Drive into Drive Tray

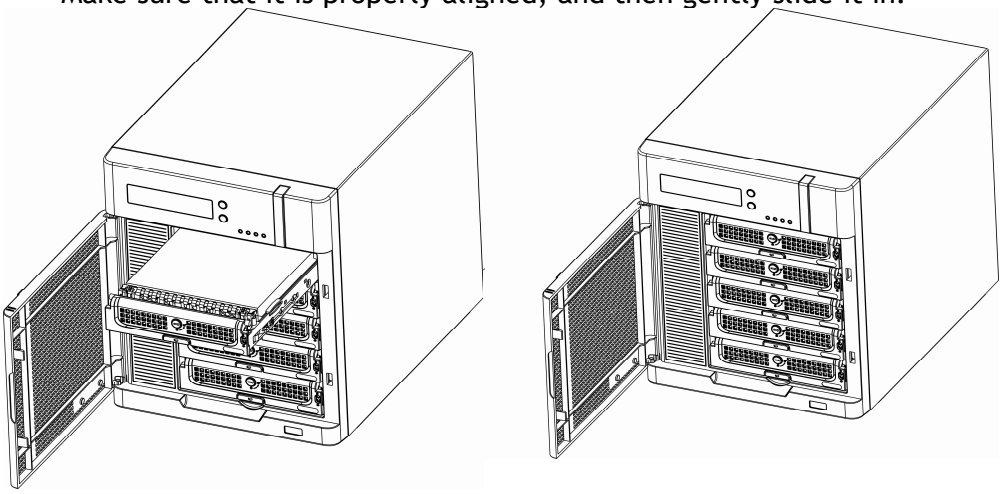
1. Make sure **the rotary bezel lock is in the unlocked position as shown in the figure below** (i.e., the groove on its face is in a horizontal orientation). Use a small-size flatblade screwdriver to turn the bezel lock.



2. **Open the bezel by pressing the release button on the front flap.** The front flap will automatically swing open.



3. **Align the drive tray with the tray slot** into which you wish to insert it. Make sure that it is properly aligned, and then gently slide it in.



Note: While replacing hard drives, users can only extract one drive tray at a time.

WARNING

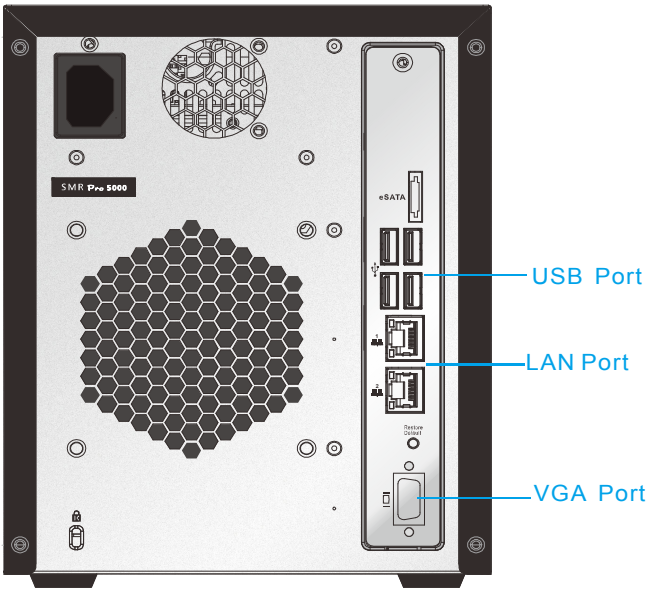
All drive bays must be populated even if it does not contain a hard drive. With one or several empty bays, ventilation will be disrupted and the SMR will overheat.

4. **Close the front flap of the front panel.** Make sure the front flap is closed properly to ensure that the connector at the back of the hard drive is firmly connected to the corresponding connector on the backplane board.

5. Once all drive trays are properly installed, the SMR system will recognize the disk drives and scan them in automatically during the power-on procedure.

3.3. Cabling

Connect cables to the rear panel ports as follows.

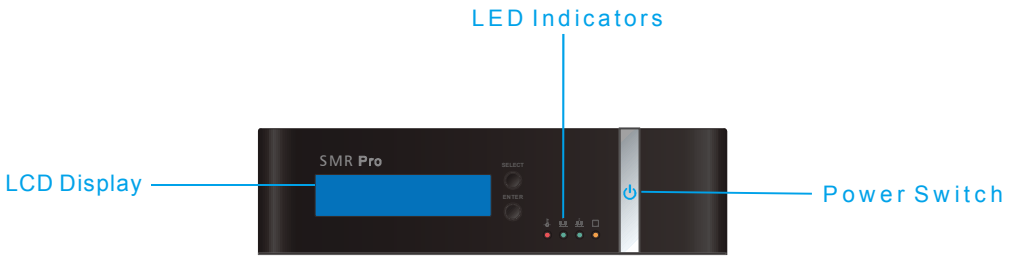


- Insert mouse, keyboard or other external devices to the USB port to operate the Video Management Software (VMS).
- Insert the LAN cable to the upper LAN port to connect the SMR to a local network where your IP cameras reside.

  (Connection to analog cameras is also available via an IP encoder.)
- Connect an external monitor capable of 32bit or higher color quality to the VGA Port to view the VMS interface.
- Connect the power cord to the power port and available outlet.

Note: (1) The LAN cable should be prepared by users. (2) Users can only use the upper LAN port.

3.4. Powering up SMR



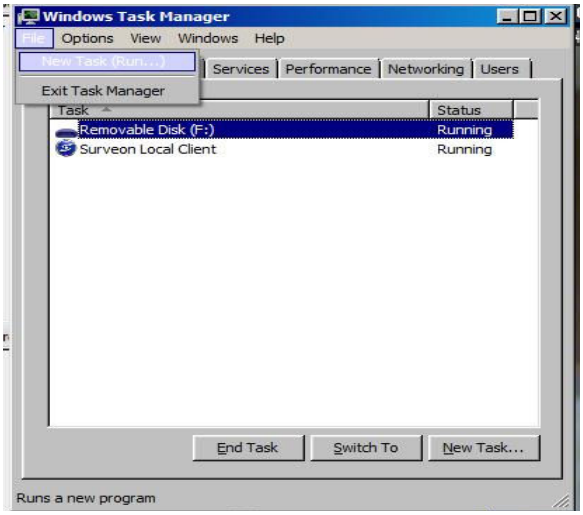
1. Press the Power Switch.
2. See if the System LED is blinking, which means the system is starting up.
3. See if the Network LED has turned green, which indicates power is on and network is connected.
4. See if the HDD LED is on, which means the hard drive can be accessed.
5. See if the IP address of the VMS Server is shown on the LCD display.

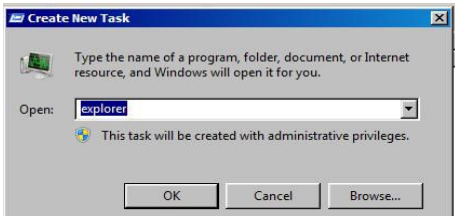
3.5. Resolution Setting

The default monitor resolution for the SMR is 1280x1024, and if the resolution of your monitor is lower than this value, the following warning message will prompt out.

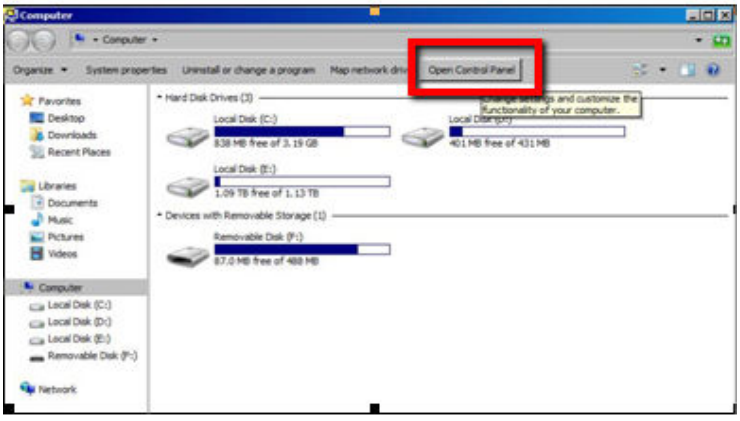
To change the resolution setting, please follow the steps below:

1. Press Ctrl+Shift+Esc to call the task manager.
2. Go to *File> New Task (Run…)* and then type "explorer" in the "Create New Task" dialogue.

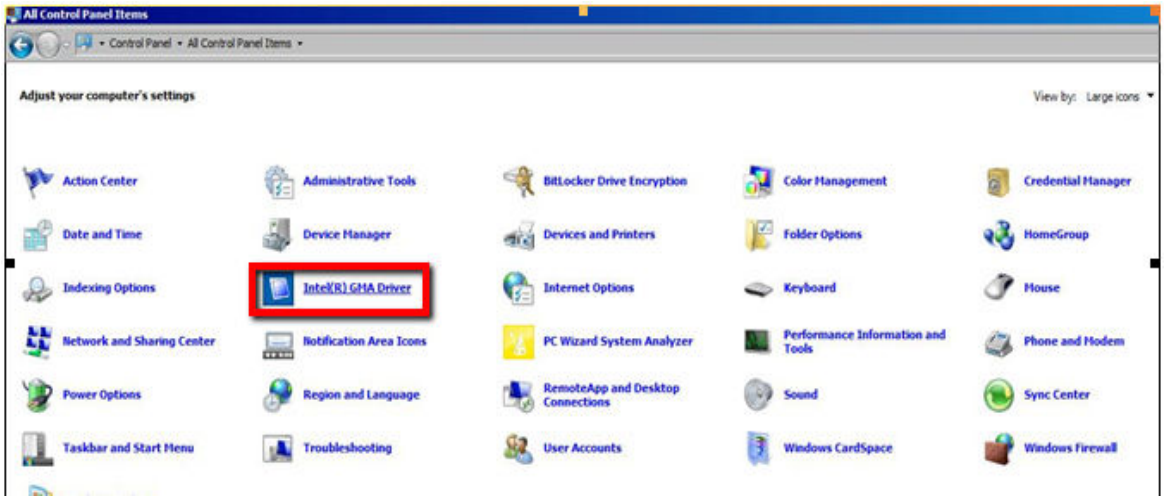



Create New Task
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
Open: explorer
This task will be created with administrative privileges.
OK Cancel Browse...

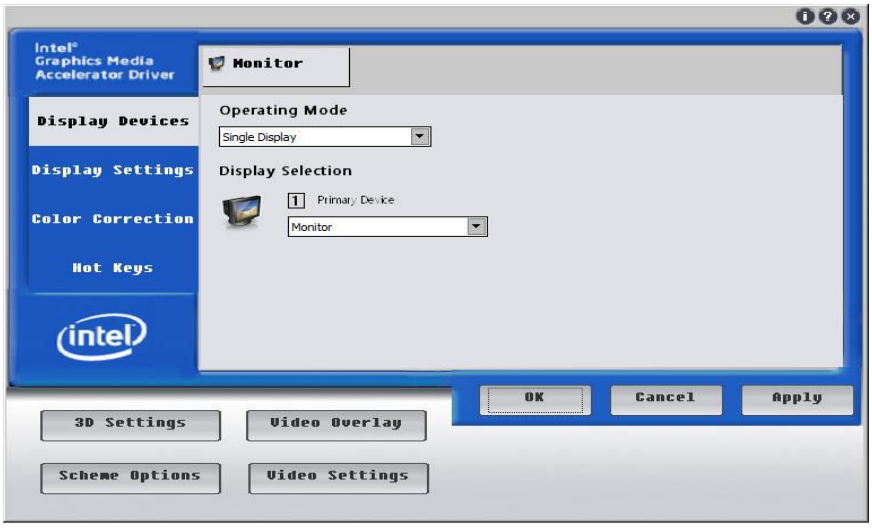
3. The Explorer Window will appear. Click **Open Control Panel** on the right top.

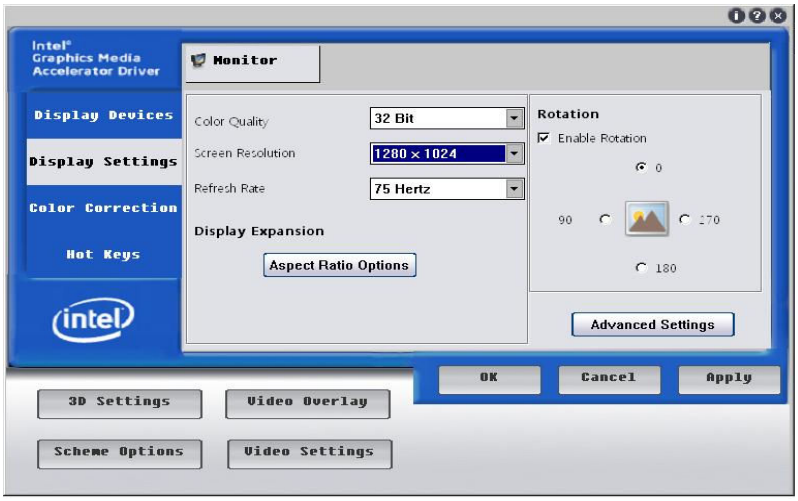

Computer
Organize System properties Uninstall or change a program Map network drive Open Control Panel
Hard Disk Drives (3)
Devices with Removable Storage (1)

4. Click **Intel(R) GMA Driver** in **All Control Panel Items** table.



5. Choose **Single Display** as the operating mode and **Monitor** as the display selection in **Display Devices**. Change the screen resolution in **Display Settings**. Click **OK** to finish.





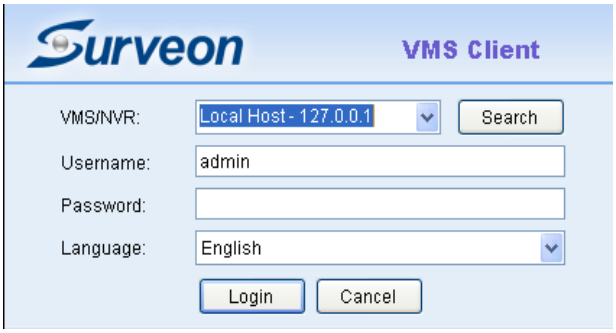
3.6. Storage Management

Follow these steps to make sure the RAID configuration and initialization are complete before the recording starts.

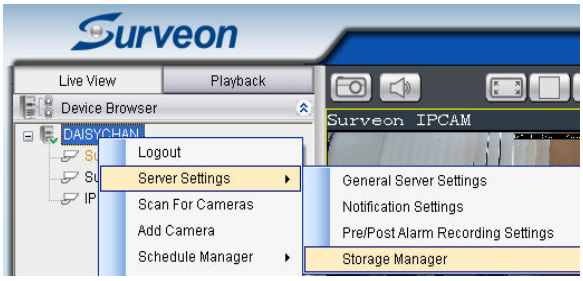
1. When the SMR is starting up, the VMS Client will start automatically. Use the following default account to login to the VMS.

   Username: **admin**

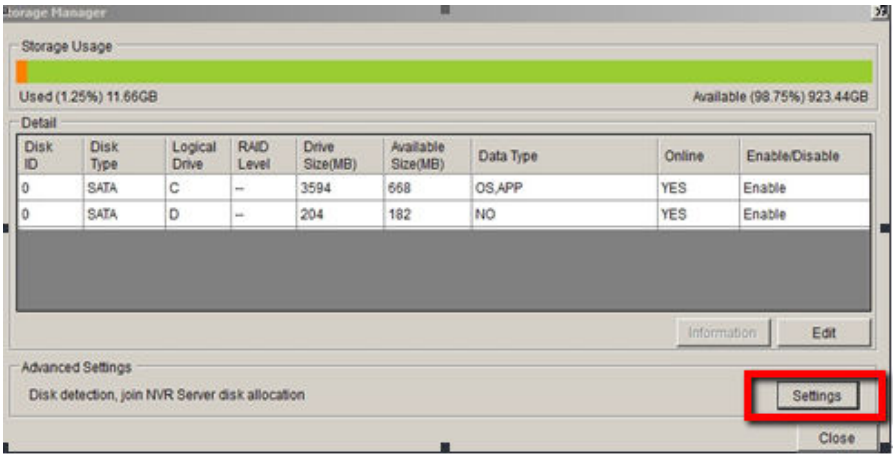
   Password: **admin**



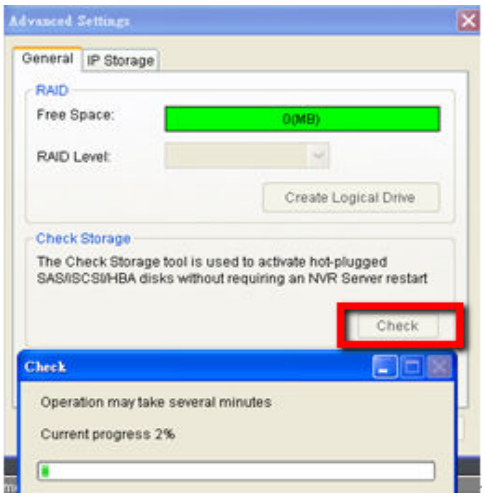
2. Go to *Server Setting* > *Storage Manager* under the Server entry.



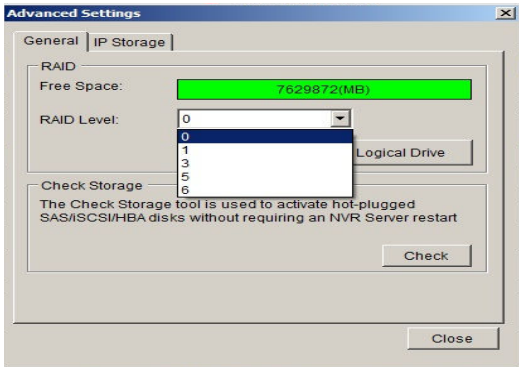
All available Logical Drives, as well as their sizes, free space, and status will appear. Clicking the target drive first and then **Settings** will allow users to create a RAID configuration onto integrated external RAID drives.



3. In the “Advanced Settings” dialogue, “General” tab, click **Check** to check the system for available external RAID drives.



4. Choose the RAID level, and then click ”Create Logical Drive” to create the RAID configuration.



※ These are default RAID configurations for the SMR models, optimized for I/O performance.

Model	Number of Hard Drives Detected(2TB)	Total Size	Default RAID Configuration	Notes
SMR5016/5020	5	8TB	RAID5	Normal application with 1 disk failure protection
	4	6TB	RAID5	Normal application with 1 disk failure protection
	5	10TB	RAID0	Normal application with no protection

5. RAID initialization will begin when all the hard drives are installed. A warning message will jump out when the initialization is in progress. Click OK.

Note: RAID initialization for SMR series will take about 28 hours (5 pieces of 2TB hard drives)/ 18.5 hours (5 pieces of 1TB hard drives) for RAID 5.

6. After initialization is complete, please restart the system.

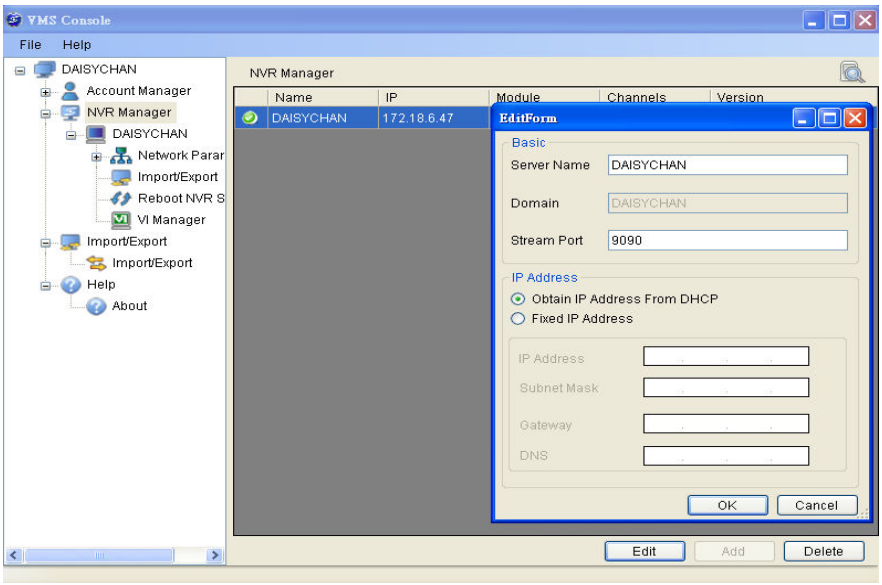
7. Go back to the Storage Manager to check if the RAID is configured successfully.

3.7. Configuring an IP Address for NVR Server

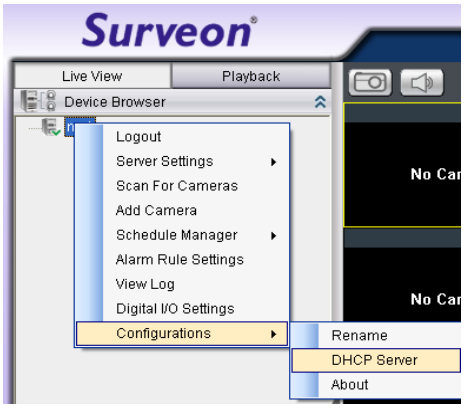
Before NVR Server can run successfully, an IP address must be properly bundled with it.

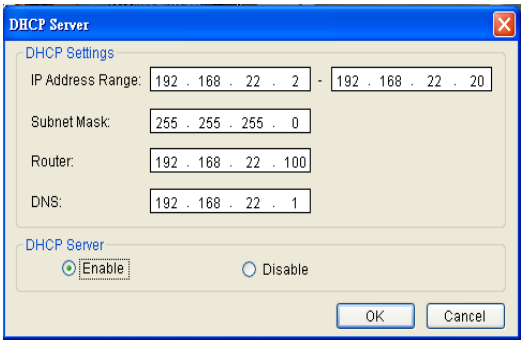
Note: (1) You may skip these steps if your routing devices have DHCP capabilities. (2) If you don't set the fixed IP in the VMS Console first, a warning massage will prompt out.

1. Login to the VMS Console, right click the NVR Manager and click edit to set a fixed IP address for your NVR Server.



2. Right-click the VMS Server and select *Configurations> DHCP Server*.
3. Click **Enable** and then **OK** to confirm the setting.





Restart the system to have the setting effective.

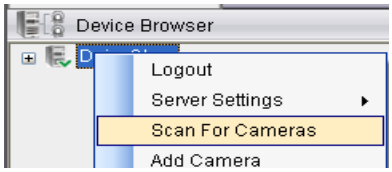
3.8. Adding Network Cameras to the Server

Once a DHCP service has been configured or ready for the network, attach the cameras to the network and wait for them to start.

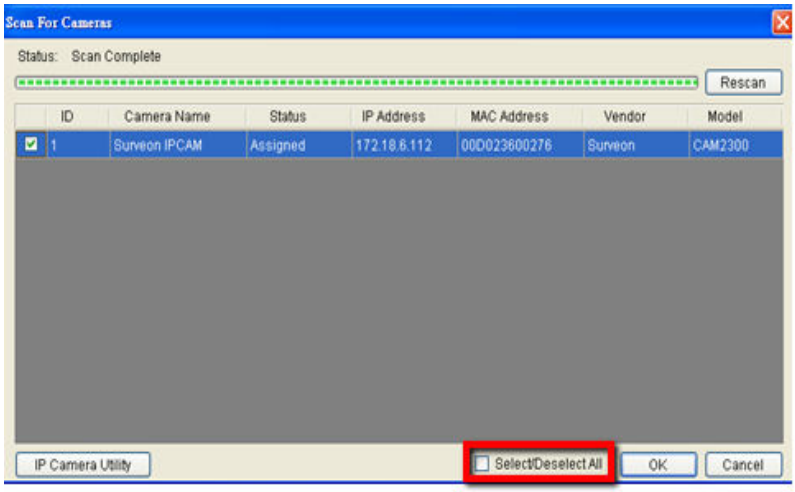
Note: Cameras should be in the same subnet as the VMS server.

Auto Scanning for Camera

1. Right-click the VMS Server entry and select **Scan for Cameras**. The cameras that can be added to the Server will be displayed.



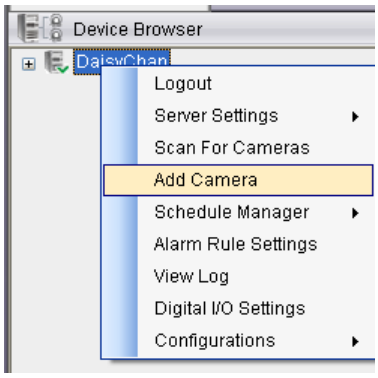
To add a camera to the system, check the box by the camera entry. You may also check the **Select All** box at the bottom of the window to select all the cameras found.

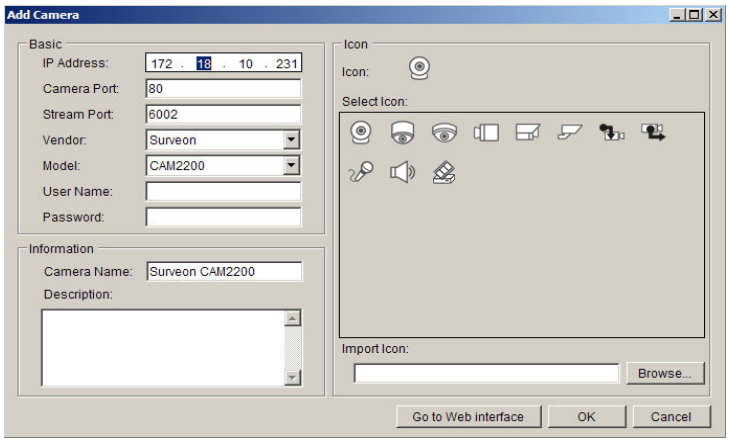


2. Enter the username and password, and press **Apply Selected**. Click **OK** to add the selected cameras to the Server.

Manually Adding Cameras

1. Right-click the Server entry and select **Add Camera**.



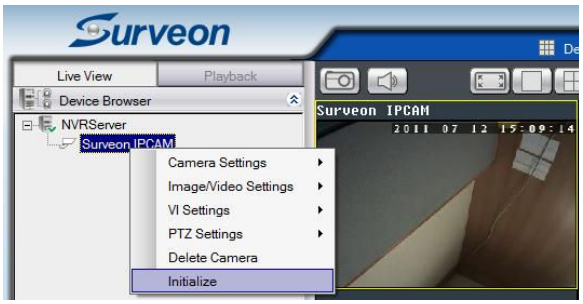


2. In the Add Camera window, please fill in the following information, and then click **OK** to add the camera.

- **IP Address**
- **Camera Port** - This value will automatically populate with the default value for the **Vendor** and **Model** selected.
- **Vendor**
- **Model**
- **Stream Port** - This value will automatically populate with the default value for the **Vendor** and **Model** selected.
- **User Name** – Camera username. This value is not always required.
- **Password** – Camera Password. This value is not always required.

3.9. Initializing the Camera

Right click the camera under the NVR Server and then click Initialize.



Click **Yes**.

These are settings before and after camera initialization.

Stream1

Camera type	Video type	Resolution	Key Frame Interval	FPS	Bitrate
1.3M	H.264	1280x1024	1 sec	15	2 Mbps
2M	H.264	1920x1080	4 sec	25 -> 15	6 Mbps -> 4 Mbps
3M	H.264	2048x1536	4 sec	15 -> 10	6 Mbps -> 4 Mbps

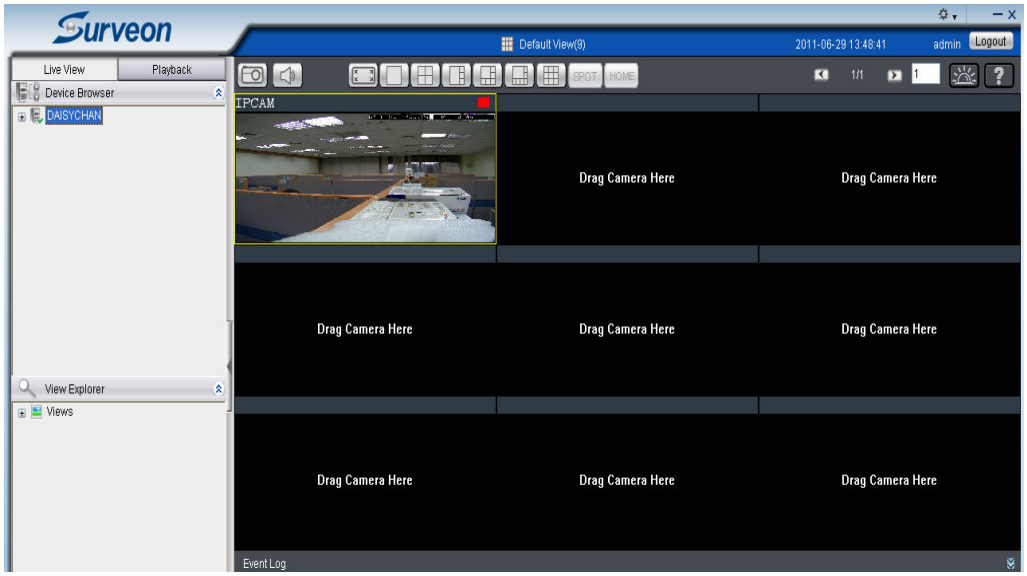
Stream2

Camera type	Video type	Resolution	Key Frame Interval	FPS	Bitrate
1.3M	H.264	320x240	1 sec	30 -> 20	1 Mbps -> 512 Kbps
2M/3M	H.264	640x480 -> 320x240	4 sec	30 -> 20	2 Mbps -> 512 Kbps

3.10. Setting up Live View

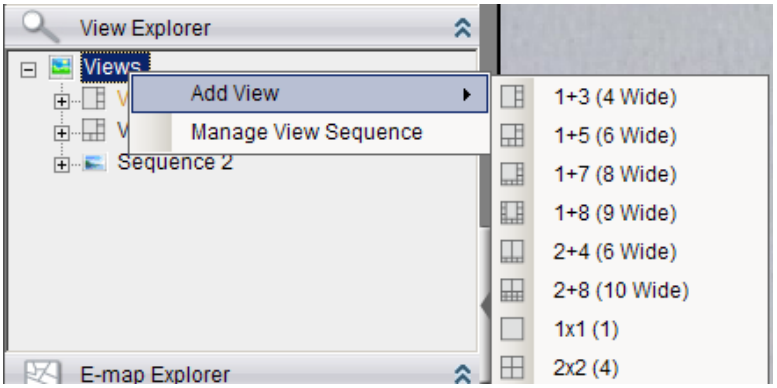
An important part of monitoring your surveillance network is to have the right views so that you will have the optimum viewing angle to discern a situation.

The default view setting is 3x3.



You can also add a customized view to the VMS Client:

1. Right click on **Views> Add View** in the *View Explorer* window of the VMS, and choose the type of view that you wish to add. The software responds by placing a blank template in the main viewing area.



2. From the *Device Browser* window, you can click and drag each camera into separate frames. The camera output will be displayed in the frame.

Note: Dragging a camera into a frame that already has an assigned camera will cause the frame to be reassigned to the new camera.